



Princess Charlotte Bay QLD03.04.01

Regional Setting

The dominant regional processes influencing coastal geomorphology in this region are the wet tropics to humid sub-tropical climate, south-east trade winds, mega-meso tides, strong tidal currents, low to moderate south-east seas (local wind-waves), the dominantly terrigenous sediments with interrupted northerly longshore sediment transport (low-moderate), the El Nino Southern Oscillation (driving sea-level variability, tropical cyclone frequency, beach erosion/accretion cycles); and the Madden-Julian Oscillation (driving weather patterns including monsoons and tropical cyclones).

Regional hazards or processes driving large scale rapid coastal changes include: tropical cyclones, storm surges, river flooding, and variable longshore sand transport.

This north-facing, protected, low-energy compartment extends from Stewart River to Bathurst Head.

Justification of Sensitivity

The sensitivity rating is a 3. The shoreline is stable, with deltaic deposit accretion and new flow of sediment into the bay.

- Princess Charlotte Bay is a 50 km wide north-facing bay fed by the North Kennedy, Bizant, Normanby and Marrett Rivers - all distributaries of the main North Kennedy and Normanby Rivers. It is bordered by Evanson Point to the west and Bathurst Head to the southeast.
- According to Short (2006), this is one of the largest coastal deltaic plains outside the Gulf of Carpentaria. It has a massive low deltaic system containing extensive salt flats, mangrove-lined creeks and rivers, and a series of both Pleistocene and Holocene chenier-beach ridges. The entire system has a



curving shoreline length of 76 km, with deposits extending up to 25 km to the south. The entire delta covers about 90 000 ha.

- According to Olley et al., (2013), subsoil erosion dominates fine sediment riverine input to Princess Charlotte Bay.
- Sand sediment on either side of the Bay tends to move south, adding to its role as a sediment sink.

Other comments

- Normanby River currently delivers around 1100 kt/yr of suspended sediment, which is roughly 5.8 times what it would be under natural vegetation and runoff conditions (see Brodie et al., 2011), although bedload is only likely to comprise ~10% of the total.
- The impact of cyclonic events is likely to be more severe, with longer beach recovery times.

Confidence in sources

Medium confidence in sources.

Additional information (links and references)

Brodie, J, Lucy A. McKergow, I P. Prosser, M F, Hughes, A and Hunter, H (2011) Sources of Sediment and Nutrient Exports to the Great Barrier Reef World Heritage Area, *Australian Centre for Tropical Freshwater Research report 03/11*



Olley, J. Brooks, A. Spencer, J. Pietsch, T. Borombovits, D. (2013) Subsoil erosion dominates the supply of fine sediment to rivers draining into Princess Charlotte Bay, Australia. *Journal of Environmental Radioactivity* v 124 pp 121-129

Short, A D (2006) *Beaches of the Northern Australian Coast: The Kimberley, Northern Territory and Cape York*, Australian Beach Safety and Management Program, University of Sydney Press